

lowest stages in the Mississippi were recorded on the 31st at Saint Louis, Missouri, and at stations southward; and between the 22d and 31st at stations north of Keokuk, Iowa. The observer at Saint Paul, Minnesota, states that, owing to the low stage of water in the upper Mississippi river during the month, it has been necessary that steamers should take barges in tow to serve as lighters.

The Missouri was highest at Yankton, Dakota, from the 1st to 4th; at Omaha, Nebraska, on the 2d; and at Leavenworth, Kansas, on the 20th. It was lowest at these stations from the 29th to 31st.

The Ohio river reached its highest stage from Cincinnati, Ohio, to Louisville, Kentucky, on the 4th and 5th; it was lowest at Cincinnati on the 20th, and at Louisville on the 27th.

Navigation in the Tennessee river at Chattanooga, Tennessee, except for small craft, was suspended on the 2d.

The highest and lowest stages of water observed at the Signal Service stations during August, 1883, are shown in the following table:

Heights of rivers above low-water mark, August, 1883.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.	
		Date.	Height.	Date.	Height.
<i>Red River:</i>	<i>Ft. In.</i>		<i>Ft. In.</i>		<i>Ft. In.</i>
Shreveport, La.....	29 9	1, 2, 17	8 10	10	5 9
<i>Arkansas:</i>					
Little Rock, Ark.....		11	4 9	3	2 7
Fort Smith, Ark.....					
<i>Missouri:</i>					
Yankton, Dakota.....	20 0	1 to 4	3 6	29, 30, 31	2 1
Omaha, Nebr.....	16 0	2	9 5	31	7 4
Leavenworth, Kans.....	21 0	20	12 1	29, 30, 31	9 3
<i>Mississippi:</i>					
Saint Paul, Minn.....	14 6	1	3 6	26	1 8
La Crosse, Wis.....	18 0	1	4 10	31	1 11
Dubuque, Iowa.....	21 10	1	11 9	22	4 3
Davenport, Iowa.....	15 0	1	9 8	27	2 11
Keokuk, Iowa.....	14 6	3, 4	10 11	28, 29, 30	4 3
Saint Louis, Mo.....	30 0	3	21 3	31	11 4
Calto, Ill.....	40 0	5	21 8	31	11 0
Memphis, Tenn.....	34 0	7, 8	16 1	31	8 6
Vicksburg, Miss.....	41 0	1	30 3	31	14 2
New Orleans, La.†.....	—2 6	1, 2	—3 9	31	—11 2
<i>Ohio:</i>					
Pittsburg, Pa.....	20 0	1	6 3	28	0 7
Cincinnati, Ohio.....	50 0	4	16 0	20	4 10
Louisville, Ky.....	24 0	5	7 11	27	4 0
<i>Cumberland:</i>					
Nashville, Tenn.....	42 0	3	10 1	31	1 9
<i>Tennessee:</i>					
Chattanooga, Tenn.....	33 0	19	2 7	13	1 2
<i>Monongahela:</i>					
Pittsburg, Pa.....	29 0	1	6 3	28	0 7
<i>Savannah:</i>					
Augusta, Ga.....	30 0	28	7 0	12	4 1
<i>Willamette:</i>					
Portland, Oreg.....		1	7 3	31	4 0
<i>Sacramento:</i>					
Red Bluff, Cal.....		1, 2, 3	0 7	4 to 31	0 6
Sacramento, Cal.....		1	7 9	31	6 9
<i>Mobile:</i>					
Mobile, Ala.....		1, 29	17 3	24	15 3
<i>Colorado:</i>					
Yuma, Arizona.....		6	19 9	31	16 8

* Below bench-mark. † Below high-water marks of 1874 and 1883.

HIGH TIDES.

Atlantic City, New Jersey.—Much damage was done at this place by the high tide of the 29th, which reached its highest point at 5.30 a. m. About two hundred and fifty places of business, including about twenty of the finest bathing houses, were washed away. The track of the Camden & Atlantic railroad, from this place to South Atlantic City, was covered with water, and it was reported that the meadows, three miles beyond the city, were totally inundated. Thousands of dollars worth of bathing suits were lost, and all kinds of business interests suffered serious loss. All of the railroad tracks between Atlantic City and Absecon, with the exception of the West Jersey railroad, were submerged and tracks injured. It is considered that \$250,000 will not replace the property destroyed.

Seabright, New Jersey, 29th.—The high tide of this date caused a washout, of one-fourth mile in length, on the New Jersey Southern railroad, at Highland station, between this place and Sandy Hook. In some places the track was covered with more than two feet of sand, which caused serious inter-

ruption to travel. A large number of drowned cattle floated ashore between this and Highland station, which are supposed to have been washed or thrown overboard from ocean steamers.

Long Branch, New Jersey, 29th.—The beach at this place was badly washed by the high tide of this date. During the afternoon the water began running over the New Jersey railroad, opposite the highlands of Navesink. The track was undetermined in several places, and at some points it was covered with nearly three feet of sand.

Newport, Rhode Island, 29th.—The heavy sea and high tide of this date washed away the platform leading from the road to the beach. The high sea prevented the steamers plying between this place and Block Island and Narragansett Pier from making their regular trips.

Ocean City, Maryland, 29th.—High tide flooding Atlantic and Wicomico avenues, and washing away a portion of the railroad bed near the station.

Boston, Massachusetts, 29th.—Very high tide and rough sea in the harbor on this date.

Block Island, Rhode Island, 12th; and unusually high on the 29th.

Portsmouth, North Carolina, 21st, 27th.

Wash Woods, North Carolina, 29th, 30th, 31st.

LOW TIDES.

Cedar Keys, Florida, 16th.

Indianola, Texas, 7th.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for August, 1883, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 86.95 per cent. The percentages for the four elements are: weather, 87.63; direction of the wind, 81.74; temperature, 89.41; barometer, 87.89 per cent. By geographical districts they are: For New England, 88.04; middle Atlantic states, 91.08; south Atlantic states, 84.50; eastern Gulf, 86.49; western Gulf, 90.66; lower lakes, 88.31; upper lakes, 85.27; Ohio valley and Tennessee, 88.95; upper Mississippi valley, 83.94; Missouri valley, 81.42; north Pacific, 100.0; middle Pacific, 100.0; south Pacific, 97.91.

There were seventy-nine omissions to predict out of 3,813, or 2.07 per cent. Of the 3,734 predictions that have been made, sixty-seven, or 1.79 per cent., are considered to have entirely failed; ninety-five or 2.54 per cent. were one-fourth verified; four hundred and thirty-three or 11.60 per cent. were one-half verified; five hundred and thirty, or 14.20 per cent., were three-fourths verified; 2,609, or 69.87 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

CAUTIONARY SIGNALS.

During August, 1883, one hundred and nineteen cautionary signals were displayed. Of these, eighty-nine, or 74.79 per cent., were justified by winds of twenty-five miles or more, per hour, at or within one hundred miles of the station. One cautionary off-shore signal was displayed, which was justified both as to direction and velocity. Seven cautionary signals were changed to northwest signals. One hundred and twenty signals, of all kinds, were displayed, of which ninety, or 75.0 per cent., were fully justified. These do not include signals ordered at display stations where the velocity of the wind is only estimated. Nine signals were ordered late.

Eighty-six winds of twenty-five miles, or more, per hour were reported, for which no signals were ordered. Many of these were high local winds or strong sea-breezes.

TEMPERATURE OF WATER.

The temperature of water, as observed in rivers and harbors at the Signal Service stations, during August, 1883, with the average depth at which the observations were made, are given in the table below. The highest water temperature recorded during the month, 92° 2, occurred at Cedar Keys, Florida; and